



**UNITED STATES MARINE CORPS  
MARINE CORPS WARFIGHTING LABORATORY  
MARINE CORPS COMBAT DEVELOPMENT COMMAND  
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IN REPLY REFER TO

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MEMORANDUM

From: Chief of Staff, Marine Corps Warfighting Laboratory  
Quantico, VA  
To: Director, Concepts Division, Marine Corps Combat  
Development Command, Quantico, VA

Subj: PROPOSED CONCEPT FOR MARINE CORPS RSTA

1. Attached is a proposed concept for Marine Corps Reconnaissance, Surveillance, and Target Acquisition (RSTA), drafted to guide experiment development and to be used as a working concept within the Warfighting Lab. Recommend it be considered for adoption as a supporting concept for the *United States Marine Corps Warfighting Concepts for the 21<sup>st</sup> Century*.
2. The Lab's POC is Major Chandler Hirsch, (703) 784-5168.

  
B. M. FORD

# A Concept for Marine Corps Reconnaissance, Surveillance, and Target Acquisition (RSTA)

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## Introduction

In the 21<sup>st</sup> Century, the Marine Corps will fulfill its national security role through execution of *Expeditionary Maneuver Warfare* (EMW), the over-arching warfighting concept that operationalizes the Corps' vision for the future as outlined in *Marine Corps Strategy 21*, and describes how the Marine Corps will organize, deploy, and employ operating forces. Conducting operations across the full spectrum of conflict, ranging from peacetime engagement, humanitarian assistance and disaster relief, peacekeeping, the Marine Corps will primarily organize as a Marine Air Ground Task Force (MAGTF), and operate in a Joint/Combined environment.

One of a number of challenging operations will be the *Ship-to-Objective Maneuver* (STOM), as described in the 1997 warfighting concept, that requires greatly increased air and ground mobility, seamless over-the-horizon (OTH) communications, improved logistics, and enhanced tactical Reconnaissance, Surveillance, and Target Acquisition (RSTA) capability. Gone will be notions of massing forces at the point of attack in order to overwhelm entrenched enemy forces on a defended beach. Gone will be a phased approach of intelligence preparation, fire support planning, and synchronized movement from amphibious shipping to a designated stretch of the coastline. Instead, Marine forces will attack from far at sea deep inland with highly maneuverable and widely dispersed tactical elements imbued with commander's intent and empowered to make independent decisions. This philosophy of maneuver warfare will rely heavily on finding and exploiting gaps in order to achieve operational objectives. It will rely on networked systems linking computers, command and control, sensors, and shooters, that sufficiently inform commanders at all levels, allowing them to adjust to changes in operational and tactical situations, and either maneuver away from enemy strengths or engage them on their own terms, as their sensing of the situation guides them.

This philosophy of maneuver warfare demands decentralized control and execution, with subordinate commanders exercising the maximum possible flexibility, with a variety of options, in performing assigned missions. While *STOM* describes a seamless attack from the seabase to objectives well beyond the coastline, the imperatives of tactical operations will change as events unfold. Unit commanders maneuvering at sea -- often in darkness, toward selected Littoral Penetration Points (LPP) on a hostile shore -- will not be *controlled* in the conventional sense. Their actions, however, are *coordinated* to prevent the unforeseen actions of one unit creating a disadvantage for another. The MAGTF's RSTA system and related command and control (C2) architectures must provide timely and relevant information during this crucial phase of mission accomplishment. Unit commanders will have little time to seek guidance or ask permission before shifting to alternate LPPs or engaging by fire newly discovered forces from previously selected ones. These critical decisions are supported by a RSTA system employed to monitor, coordinate, and support the scheme of maneuver.

Reconnaissance and maneuver elements employ air, ground, attended and unattended sensors, and Marines on the ground, to cover information gaps left by non-organic sources. Mechanical sensors extend the senses of Marines and assist in meeting unit-specific, tactical information requirements, while simultaneously providing data to increase battlespace awareness throughout the joint force.

However, the additional speed, maneuverability, and range of STOM operations add potential risk. As forces are more dispersed, a networked tactical RSTA grid is essential to prevent surprise and to provide mutual support. An effective RSTA system under the control of the Marine commander at the tactical level is a key risk mitigation enhancement. National-level, theater, and Joint Information Surveillance and Reconnaissance (JISR) products will not and cannot fully satisfy tactical information requirements. The organic tactical RSTA system is the primary means that Marine commanders at all levels have to collect tactically relevant information to amplify information available from the JISR

### **RSTA Concept**

The RSTA concept is not about technology, targeting, or achievement of perfect knowledge. It acknowledges our warfighting philosophy that recognizes the delicate balance between time and uncertainty. It is about providing the tactical commander a capability to direct his own human and mechanical *sensors* to obtain the information he needs to make timely decisions. Simultaneously, it shares this same information with other commanders and their staffs through the MAGTF's *common tactical picture (CTP)*.

The CTP provides a fused assessment and near-real-time visual display of the battlespace to include comprehensive awareness of the environment and status of friendly, adversary and neutral forces, as well as noncombatants. The CTP enables commanders at all levels to share situational awareness through common data, with the understanding that any information pertinent to a nonlinear battlefield is perishable, incomplete, and sometimes wrong. Adversaries can be assumed to be no less adept at deception than Marines. Accordingly, some data within the CTP can be expected to be wrong. Additionally the display will only be as good as the information inputted and there will be human input error. One of the key contributions of the RSTA grid is to allow the commander to own assets that can be used to confirm suspect data in the CTP and to focus collection on areas where accurate data is most important to effective mission accomplishment.

No matter how effective the RSTA grid is in generating local situational awareness, it must be connected to a digital network that shares information and supports cross referencing of reports and intelligence fusion. Effective situational awareness across echelons of command occurs only when the CTP integrates data from the organic RSTA grid with products from JISR and other sources. Experience has demonstrated the effectiveness of integrating real-time targeting data from forces on the ground with national sensors to generate overwhelming combat power.

The RSTA system is a key enabler of maneuver warfare. Accordingly, the RSTA system must be as deployable and as mobile as the Marine forces that it is intended to support. In addition, it

must be as adaptable to changes in environmental and operational setting as are Marine operational forces. The RSTA system must be useful in all weather conditions, both day and night, and in complex terrain to specifically include urban operations. Integration of the RSTA system with existing command and control (C2) and weapons systems is essential.

The Marine Corps philosophy of maneuver warfare drives RSTA toward a *bottom-up*, vice *top-down* approach. A tactical RSTA system provides an organic, responsive capability that the commander controls and focuses to provide the fidelity needed for decision making. Not only does a tactical RSTA capability provide a key capability to the tactical commander, it also complements and enhances the operational commander's situation awareness. Our most common and discriminating sensors are Marines. Information being fed back from Marines and mechanical sensors at the tactical level will, in many cases, be the most current and accurate source of intelligence available to the MAGTF and Joint Force Commanders.

## **RSTA Concept Execution**

The RSTA concept supports the tactical information needs of commanders at all levels. As discussed above, the tactical RSTA system is a grid fed from the bottom up, not from the top down as in the case of national intelligence and JISR. Therefore, the tactical units at the company level are the foundation of any RSTA system. Accordingly, a stand alone capability must exist within the infantry battalion that is capable of coordinating the employment of organic RSTA assets to support the commander's information needs in the areas of (1) situational awareness and force protection, (2) indications and warning (I&W), (3) planning and execution, and (4) battle damage assessment.

Situational Awareness and Force Protection. Tactical RSTA provides immediately actionable combat information directly from sensors, allowing tactical commanders to see over the next hill, inside buildings and around corners in complex terrain, and in other inaccessible terrain with less risk to Marines. The RSTA system capability is also key to the commander in mitigating risk and protecting the force.

Indicators and Warning. RSTA must provide I&W of threats or impending attack in sufficient time for an appropriate response. Tactical RSTA provides information necessary to assess enemy force strength and deployment, defensive and offensive capabilities, and other factors that may affect military plans and operations. I&W requirements may require both continuous surveillance and as-required reconnaissance.

Planning and Execution. Tactical RSTA provides detailed information (terrain, enemy disposition, movement, offensive and defensive capabilities) essential for target engagement, maneuver of forces, and rapid tactical planning.

Battle Damage Assessment (BDA). The RSTA system must support BDA at all levels of the command before, during, and after the conduct of operations. BDA provides an important means for the tactical commander to assess friendly deception efforts, supporting detection of enemy military deception, as well as retargeting and maneuver.

## RSTA Components

The RSTA system contains two crucial components, the ***RSTA Grid*** and the ***Common Tactical Picture***.

**The RSTA Grid** – The *RSTA Grid* is a network of forces and sensors within the area of operations. This network, composed of mechanical and human sensors – individual Marines and Marine operating units -- provides reconnaissance, surveillance, and target acquisition for a prescribed area. ***A seamless information-sharing network must link grid components.*** Since RSTA assets are information gathering resources, the planning for and establishment of the RSTA Grid must be linked to the commander's information requirements and targeting priorities. Using the requirements and priorities as inputs, the Intelligence Preparation of the Battlespace (IPB) process will guide the intelligence collection plan. The intelligence collection plan functions as the major factor in determining how to employ and allocate RSTA assets to create the grid. The grid is an integrated collection of RSTA assets positioned at various locations within the battlespace designed to meet commanders' information requirements. The grid must be rapidly moveable, flexible and adaptable in order to respond to the dynamic requirements of the battlespace.

- **Common Tactical Picture** – The CTP is the most current depiction of a prescribed battlespace in a comprehensible visual display of all known or suspected units, to include friendly, enemy, and pending tracks. The CTP is derived from the common tactical database (CTD) and other sources and refers to the depiction of the battlespace for a single operation within a commander's area of operations. The CTP includes current, anticipated or projected, and planned dispositions of hostile, neutral, and friendly forces. The CTP includes force location and real time and non-real time sensor information. This visual display of the battlespace is derived from the combination of intelligence data from higher echelons – specifically the JISR – and the tactical RSTA grid. The RSTA grid, comprised of mechanical and human sensors, provides real and near real time information to the CTP that enables commanders to make timely decisions. This battlefield picture creates battlespace awareness and provides a common understanding of the battlespace among MAGTF units and commanders. The processed data and information is automatically portrayed in such a manner as to permit pattern recognition and implicit understanding among commanders at all echelons in order to facilitate effective decision-making and decentralized execution.

The goal of the CTP is to display relevant, battlespace information as close to real time as possible, so that commanders can plan and execute missions in a fluid and dynamic operational environment. It provides battlespace awareness so commanders can develop the situation, maneuver to avoid the enemy's strength, attack critical vulnerabilities, and make decisive contact to defeat the enemy at a time and place of their choosing.

## **Tactical RSTA and C2**

All echelons of the MAGTF, to include the Ground Combat Element (GCE), infantry battalion and company, will maintain a capability to coordinate all aspects of sensor support, to include planning, coordination and integration with the commander's concept of operation and the scheme of maneuver. That capability also includes collection management and coordination of sensor data for maneuver decisions, target acquisition, target dissemination, and target recommendation and assessment. The G-2/S-2 may supervise this function under staff cognizance of the G-3/S-3, within the Combat Operations Center (COC). At infantry company level, the commander will be responsible for coordination and employment of his sensors, and organizing his personnel accordingly. The number of personnel required will vary with the level of command, concept of employment, availability of the various sensors, size and complexity of the forces involved, developmental maturity of the components within the sensor grid, and the desires of the commander.

## **Tactical RSTA System Developmental Priorities**

The measure of effectiveness of any RSTA system is its ability to meet the battlespace information needs of tactical commanders and decision makers. The challenge inherent in expeditionary maneuver warfare is to provide timely, relevant information to rapidly maneuvering forces throughout the range of naval expeditionary operations. Developmental efforts must focus on devising and improving Marine Corps RSTA capability in the following areas:

- Battlespace/situational awareness via a networked array of sensors.
- Flexibility and survivability of sensors.
- Rapid planning and decision making through information processing and display of various forms of information.
- Supporting multiple, high tempo operations consistent with maneuver warfare.
- Timely and accurate target acquisition and BDA.
- Force protection.
- Automated links from the RSTA Grid to CTD/CTP.
- Collection and distribution of information critical to Battle Damage Assessment (BDA)

## **Key Characteristics of an Effective RSTA System**

### **Connectivity**

The RSTA system must be able to transmit accurate and timely information to those who must receive it, when they need it. Connectivity depends on active management of the information flow. Tailoring information to the needs of the commander prevents critical intelligence from being delayed or lost in irrelevant data. Information on vital enemy targets acquired by RSTA assets becomes useless unless disseminated in a timely fashion to the forces tasked to attack and destroy the targets. Interoperability, commonality, and connectivity improve and unify RSTA capabilities and enhance planning and execution.

The ability to operate with the other services and likely coalition partners is a fundamental design criteria for a RSTA system. Properly engineered, the RSTA system will be useful for a broad range of naval, joint and coalition missions.

Interoperability and commonality also improve the overall capability of RSTA through cross cuing<sup>1</sup>, information enhancement, and analytical exchange to accurately portray the battlefield. The multidiscipline, multisource approach reduces the risk of deception by the enemy.

### **Responsiveness**

RSTA assets must be sufficiently responsive to meet the needs of the commander at any point along the operational continuum and in any scenario. Commanders at all levels should have RSTA assets available to provide information when and where needed. The responsiveness of the RSTA assets available to any commander must be looked at in aggregate and be driven by the missions that must be accomplished. The commander must examine the range of required missions and ensure that appropriate and sufficient RSTA assets are employed and positioned to meet C2 needs.

### **Survivability**

Survivability must be commensurate with the threats to which the RSTA assets will be exposed during the course of operations. These assets must be as survivable as the operational systems and forces they support. Survivability must be assessed for the entire RSTA system—collection platforms, sensors, communications and data links, ground stations, processing facilities, personnel and operators, etc. Not all systems, or nodes within a system, need to have the same degree of survivability. Nevertheless, technology can enhance survivability of many unmanned, remote sensors. Miniaturization will complicate enemy counter-collection efforts, and larger numbers of distributed small, inexpensive sensors provide redundancy and flexibility in the event of losses. In addition, low probability of intercept, low probability of detection (LPI/LPD) communications will both enhance survivability and security. Many RSTA assets will be vulnerable and relatively scarce. Commanders must prioritize the use of RSTA assets and consider how they would compensate for the loss of a RSTA capability should any specific asset or group of assets be destroyed or become unavailable. Besides careful planning, intelligent tasking, and effective employment tactics, redundancy and overlap of capability are perhaps the best ways of ensuring the survivability of specific RSTA capabilities and functions.

### **Adaptability**

In addition to providing the commander the information he needs to facilitate the decision-making process, the RSTA system must be adaptable enough to be deployed on and employed from various platforms, in a variety of environments, range of distances and types of climates. Furthermore the RSTA system must be able to expand or contract along with the size of the operational area of the forces that employ it.

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<sup>1</sup> Cross cuing is the capability of the RSTA grid to use the triggering of one sensor to activate other sensors to classify an event or signal of interest.

**Mobility**

Expeditionary Maneuver Warfare exploits the inherent mobility of naval forces and the use of the sea as a maneuver space. Surface and vertical maneuver elements will operate across greater distances with greater speed than ever before. RSTA assets must support these units as they seamlessly transition from maneuvering at sea to maneuvering ashore. Maneuverability fosters flexibility, which in turn permits commanders to adapt the RSTA system during execution in order to respond to changing perceived threats or opportunities. Components of the RSTA system should be retaskable and mobile enough to adjust to new missions, or to adapt to new monitoring positions. They should enable rapid and continuous maneuver and high tempo operations consistent with maneuver warfare, regardless of terrain or operational environment, to include urban operations.

**Accuracy and Utility**

Information provided by the RSTA system must be accurate and usable in the short time frames associated with EMW. As the use of precision weapons becomes standardized in military operations, knowing exact location, often to the foot, or even inch, is imperative for the targeting process. Reconnaissance and surveillance may not require pinpoint accuracy, but target acquisition requires a sensor grid that ultimately produces a target location or aim point suitable for attacking systems. The entire RSTA system must be worth the expense in manpower demands, logistical burden, maintenance and training costs to justify existence at each level of command supported.

**Summary**

This paper describes a proposed concept for Marine Corps RSTA to support Expeditionary Maneuver Warfare and the execution of its most challenging missions such as STOM. Marine Corps tactical commanders require an organic, tactical RSTA capability to accomplish military operations envisioned in future Marine and Joint concepts. Past combat operations and future operational concepts highlight a critical need for significantly enhanced RSTA capabilities. While national and theater based intelligence systems assist strategic and operational level commanders, tactical commanders from the MAGTF down to the company must have adequate RSTA capabilities to see over the next hill or into the next building. Management of the RSTA system requires a networked approach that integrates the many disparate systems of the RSTA Grid with a CTP that is relevant, accurate, and provides commanders at all levels with the information needed to effectively manage the battlespace during mission execution. An integrated RSTA system will result in improved battlespace awareness and provide enhanced combat capabilities while simultaneously providing force protection and denying the enemy information related to our actions and intentions. Future tactical RSTA systems, designed to operate as an integrated and deployable package, will provide a leap-ahead capability for Marine maneuver units conducting Expeditionary Maneuver Warfare.